

CLAIMS

1. A method for communicating resource requests for dedicated uplink channel resources in a mobile communication system comprising the following step performed by the mobile terminal:

transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station controlling a serving cell, wherein the control information comprises a resource request flag that, when set, requests the base station to increase uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the mobile terminal does set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel utilizing the maximum amount of uplink resources set by a scheduling grant.

2. A method for communicating resource requests for dedicated uplink channel resources in a mobile communication system comprising the following step performed by the mobile terminal:

transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station controlling a serving cell, wherein the control information comprises a resource request flag that, when set, requests the base station to increase uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the mobile terminal does not set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel without utilizing the maximum amount of uplink resources set by a scheduling grant or the mobile terminal is in a process of step-wise increasing the amount of uplink resources utilized for uplink data transmissions.

3. The method according to claim 1 or 2, further comprising the steps of:

receiving a scheduling grant setting the maximum amount of uplink resources the mobile terminal is allowed to utilize for the transmission of uplink data via the uplink dedicated channel from the base station controlling the serving cell, and

if the amount of uplink resources utilized for uplink data transmission is lower than the maximum amount of uplink resources, step-wise increasing the amount of uplink resources utilized for uplink data transmissions via the dedicated uplink channel until the utilized amount of uplink resources is equivalent to the maximum amount of uplink resources,

4. The method according to one of claims 1 to 3, further comprising the steps of:

determining the occupancy of a buffer in the mobile terminal buffering data to be transmitted via the dedicated uplink channel,

setting the resource request flag to request the base station to increase the uplink resources for uplink data transmissions via the uplink dedicated channel, if all of the following criteria are met:

- a) the power status of the mobile terminal allows for uplink data transmission via the dedicated uplink channel utilizing more uplink resources than the maximum uplink resources set by the scheduling grant of the base station controlling the serving cell,
- b) the maximum uplink resources set by the scheduling grant from the base station controlling the serving cell require more than a configurable number of transmission time intervals for transmitting buffered uplink data via the dedicated uplink channel, and
- c) the mobile terminal is currently utilizing the maximum uplink resources set by the scheduling grant for uplink data transmission.

5. The method according to one of claims 1 to 4, wherein the scheduling grant indicates the maximum uplink resources all mobile terminals controlled by the base station of the serving cell transmitting data via a dedicated uplink channel respectively are allowed to utilize for uplink data transmissions via the uplink dedicated channels within a transmission time interval.

6. The method according to one of claims 1 to 5, wherein the mobile terminal is in soft handover between a serving cell controlled by the base station and a non-serving cell controlled by a base station, and

the method further comprises the steps of:

transmitting the uplink data via a dedicated uplink channel to the base station controlling the non-serving cell, and

setting the maximum uplink resources the mobile terminal is allowed to utilize for uplink data transmissions via both dedicated uplink channels according to the scheduling grant received from the base station controlling the serving cell.
7. The method according to claim 6, further comprising the steps of:

receiving a relative scheduling grant from the base station controlling the non-serving cell indicating to decrease the amount of uplink resources currently utilized by the mobile terminal,

decreasing the amount of uplink resources currently utilized by the mobile terminal in response to the relative scheduling grant, and

setting the maximum amount of uplink resources to a decreased amount of uplink resources for uplink data transmission in the next transmission time interval.
8. The method according to claim 7, wherein the mobile terminal sets the resource request flag to request the base station to increase the uplink resources for uplink data transmissions via the uplink dedicated channel, if all of the following criteria are met:
 - a) the power status of the mobile terminal allows for uplink data transmission via the dedicated uplink channel utilizing more uplink resources than the maximum uplink resources set by scheduling grants from the serving cell and/or the non-serving cell,

- b) the maximum uplink resources set by the scheduling grants requires more than a configurable number of transmission time intervals for transmitting buffered uplink data via the dedicated uplink channel, and
- c) the mobile terminal is currently utilizing the maximum uplink resources set by the scheduling grants for uplink data transmission.

9. The method according to claim 7 or 8, wherein the control information transmitted via the dedicated control channel to the base station controlling the serving cell further comprises a transport format indicator indicating the transport format combination used for transmitting uplink data to the base station controlling the serving cell within a transmission time interval, wherein the transport format indicator indicates a transport format combination utilizing a lower amount of uplink resources than allowed by the base station of the serving cell in the scheduling grant, and

if the mobile terminal is transmitting uplink data via the uplink dedicated channel to the base station controlling the serving cell utilizing the decreased amount of uplink resources, setting the resource request flag in the control information transmitted in the transmission time interval to the base station controlling the serving cell,

wherein the combination of the transport format indicator and the resource request flag in the control information indicates to the base station controlling the serving cell that the maximum amount of uplink resources has been decreased based on a relative scheduling grant received from the base station controlling the non-serving cell.

- 10. The method according to one of claims 1 to 9, wherein the step size when step-wise increasing the amount of uplink resources is configurable.
- 11. The method according to claim 10, further comprising the steps of receiving control information indicating the step size, and setting the step size according to the control information.

12. The method according to claim 11, wherein control information indicating the step size set the step size to a value equal to the difference between the maximum amount of resources the mobile terminal is allowed to utilize and the amount of uplink resources currently utilized by the mobile terminal.
13. A mobile terminal for communicating resource requests for dedicated uplink channel resources in a mobile communication system comprising:

a transmitter for transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station controlling a serving cell, wherein the control information comprises a resource request flag that, when set, requests the base station controlling the serving cell to increase uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the mobile terminal is adapted to set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel utilizing the maximum amount of uplink resources set by a scheduling grant.
14. A mobile terminal for communicating resource requests for dedicated uplink channel resources in a mobile communication system comprising:

a transmitter for transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station, wherein the control information comprises a resource request flag that, when set, requests the base station controlling the serving cell to increase uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the mobile terminal is adapted to not set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel without utilizing the maximum amount of uplink resources set by a scheduling grant or the mobile terminal is in a process of step-wise increasing the amount of uplink resources utilized for uplink data transmissions.
15. The mobile terminal according to claim 13 or 14, further comprising:

a receiver for receiving a scheduling grant setting the maximum amount of uplink resources the mobile terminal is allowed to utilize for the transmission of uplink data via the uplink dedicated channel from the base station controlling the serving cell,

processing means for step-wise increasing the amount of uplink resources utilized for uplink data transmissions via the dedicated uplink channel until the utilized amount of uplink resources is equivalent to the maximum amount of uplink resources, if the amount of uplink resources utilized for uplink data transmission is lower than the maximum amount of uplink resources,

16. The mobile terminal according to one of claims 13 to 15, further comprising means adapted to perform the steps of the method according to one of claims 3 to 12.

17. A computer readable medium storing instructions that, when executed by a processor of a mobile terminal, cause the mobile terminal to communicate resource requests for dedicated uplink channel resources in a mobile communication system, by:

transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station, wherein the control information comprises a resource request flag that, when set, requests the base station controlling the serving cell to increase the uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the instruction cause the mobile terminal to set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel utilizing the maximum amount of uplink resources set by a scheduling grant.

18. A computer readable medium storing instructions that, when executed by a processor of a mobile terminal, cause the mobile terminal to communicate resource requests for dedicated uplink channel resources in a mobile communication system, by:

transmitting via a dedicated uplink control channel uplink control information associated to uplink data to a base station, wherein the control information comprises a resource request flag that, when set, requests the base station controlling the serving cell to increase the uplink resources for uplink data transmissions via an uplink dedicated channel, and

wherein the instruction cause the mobile terminal to not set the resource request flag, if the mobile terminal transmits uplink data via the dedicated uplink channel without utilizing the maximum amount of uplink resources set by a scheduling grant or the mobile terminal is in a process of step-wise increasing the amount of uplink resources utilized for uplink data transmissions.

19. The computer readable medium according to claim 17 or 18, further storing instructions that, when executed by the processor of the mobile terminal cause the mobile terminal to perform the steps of the method according to one of claims 3 to 12.